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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
TORRES, JUAN A	
ART UNIT	PAPER NUMBER
2631	

DATE MAILED: 06/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/729,443	JAFFE ET AL.	
	Examiner	Art Unit	
	Juan A. Torres	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 March 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-16,18-22,24,30-42,44-48,50-54 and 56-61* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-16,18-22,24,30-42,44-48,50-54 and 56-61* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 March 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawings were received on 03/22/2005. These drawings are accepted by the Examiner.

Specification

The modifications to the specification were received on 03/22/2005. These modifications are accepted by the Examiner.

Claim Objections

In view of the amendment filed on 03/22/2005, the Examiner withdraws claim objections of claims 4, 12 and 45 of the previous Office Action.

Claim Rejections - 35 USC § 112

In view of the amendment filed on 03/22/2005, the Examiner withdraws the 35 USC § 112 rejection to claim 7 of the previous Office Action.

Response to Arguments

Applicant's arguments filed on 03/22/2005 have been fully considered but they are not persuasive.

The Applicant contends, "The Office Action states that the disclosure does not teach the use of a third signal between the first and the second signal. Claim 7 does not call for a "third signal," rather, it calls for a "reference signal" which is disclosed in the specification, for example, in the paragraph starting on line 24 of page 1. Claims 9, 13, 14, 38, 39, and 46 do call for a "third signal" which is disclosed in the paragraph starting on line 31 of page 4 stating: "Any number of trellis encoders separated by interleavers

may be used, but two are shown for the sake of simplicity." Disclosing more than two encoders leads to disclosing more than two signals. Therefore, a third signal is also supported by the specification. Accordingly, it is respectfully requested that the above rejections are withdrawn".

The Examiner disagrees and asserts, as indicated in the previous office action, that the disclosure doesn't teach the use of a third signal between the first and second signal.

The Applicant contends, "Claim 4 was rejected because, according to the Office Action, Langlais teaches this limitation in figure 2 and in the last line of the first paragraph of section II.A. Applicants respectfully differ on this point. The cited passage of Langlais states: "Figure 1 shows the classical diagram of a phase recovery system ... followed by the turbodecoder. The decoding process is based on the serial concatenation of decoder DECI and DEC2, both using Soft Output Viterbi Algorithm." It is the decoding system of Langlais that is a Viterbi decoder. This decoder, in Langlais, is located after the slicer and the phase detector and serves a different purpose. There is no mention in Langlais that the phase recovery or phase detection system also includes a Viterbi decoder. Therefore, the Viterbi decoder of Langlais is distinguished from the claimed Viterbi decoder, because it is not used for "adjusting the multiplied first signal based on the multiplied first and second signals." As such, Applicants submit that claim 1, as amended, is not anticipated by Langlais under 35 U.S.C. 5102(a) and respectfully request the withdrawal of the rejection".

The Examiner disagrees and asserts, that, as indicated in the previous office action, figure 2 shows the limitations of claim 4 "Viterbi decoding the multiplied first signal". It is clearly indicated in figure 2 that the Viterbi decoder that is in the block "modulo of turbo-decoder" as indicated in the mentioned paragraph in DEC1 is used for adjusting the multiplied first signal based on the multiplied first and second signals, so Langlais clearly includes in the phase recovery or phase detection system a Viterbi decoder.

The Applicant contends, "Claims 2, 3, 5 - 8, 10, and 11 are dependent from claim 1 and therefore include all the limitations of claim 1 and additional limitations therein. Accordingly, these claims are also allowable over Langlais, as being dependent from an allowable independent claim and for the additional limitations they include therein. The withdrawal of the rejections is respectfully requested".

The Examiner disagrees and asserts, that, because the rejection of claim 4 is maintained, the rejections of claims 2, 3, 5 - 8, 10, and 11 also are maintained.

The Applicant contends, "Independent claims 15, 21, 27, 33, 47, and 53 are distinguished from Langlais for reasons similar to those pertaining to claim 1, as discussed above, and are allowable over Langlais. The withdrawal of the rejections is respectfully requested.".

The Examiner disagrees and asserts, that, because the rejection of claim 4 is maintained, the rejections of claims 15, 21, 27, 33, 47, and 53 also are maintained.

The Applicant contends, "For example, amended claim 21 includes, among other limitations, "a slicer having an input coupled to the multiplier, and an output, wherein the

slicer comprises a Viterbi decoder". This slicer is distinguished from the decoder of Langlais because Langlais" decoder is not "coupled to the multiplier." As explained above, the decoder of Langlais begins where the device of claim 21 ends.".

The Examiner disagrees and asserts, that, Langlais decoder is coupled to the multiplier (see the multiplier in figures 1 and 2).

The Applicant contends, "Claims 16, 18, and 19 depend from claim 15. Claims 22, 24, and 25 depend from claim 21. Claims 28, 30, and 31 depend from claim 27. Claims 34 - 36, 40 - 42, 44, and 45 depend from claim 33. Claims 48, 50, and 51 depend from claim 47. Claims 54, and 56 - 59 depend from claim 53. These dependent claims include the limitations of the claims from which they depend and additional limitations therein. Accordingly, these dependent claims are also allowable over Langlais, as being dependent from allowable independent claims, and for the additional limitations they include therein".

The Examiner disagrees and asserts, that, because the rejection of claim 4 is maintained, the rejections of these claims is also maintained

The Applicant contends, "Regarding the 35 U.S.C. 5103(a) rejections over Langlais and Robertson, without admitting the validity of combining the references, Applicants submit that, as discussed above, Langlais does not teach or suggest the limitations of the independent claims as amended. Robertson does not cure this deficiency. As such, Applicants submit that the invention as claimed in amended claims 12, 20, 26, 32, 52, and 60 and also claims 37, 59, and 61 is not taught or suggested by

Langlais and Robertson, alone or in combination. These claims are allowable over the cited references, and withdrawal of the rejection is respectfully requested".

The Examiner disagrees and asserts, that, because the rejection of claim 4 is maintained, the rejections of these claims is also maintained

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 9, 13-14, 38-39 and 46 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The disclosure doesn't teach the use of a third signal between the first and second signal.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-3, 5-8, 10-11, 15-16, 18-19, 21-22, 24-25, 27-29, 30-31,33-36, 40-45, 47-48, 50-51 and 53-59 are rejected under 35 U.S.C. 102(a) as being anticipated by Langlais et al. ("Synchronization in the carrier recovery of a satellite link using turbo-

codes with the help of tentative decisions", IEE Colloquium on Turbo Codes in Digital Broadcasting - Could It Double Capacity? 22 Nov. 1999 pages: 5/1 - 5/7).

As per claim 1 Langlais et al. teach a method of processing signals, comprising: receiving first and second signals each being modulated on a carrier signal, the first signal preceding the second signal in time (figure 2 page 5/1 section II.A); multiplying each of the first and second signals with a reference signal having a reference frequency (figure 2 multiplier after y(k) page 5/1 section II.A); adjusting the multiplied first signal based on the multiplied first and second signals where the adjustment of the multiplied first signal comprises Viterbi decoding (figure 2 phase detector page 5/1 section II.A, the Viterbi decoding is done in DEC1 and feed to the mapper); comparing the adjusted first signal to the multiplied first signal (figure 2 phase detector page 5/1 section II.A); and adjusting the reference frequency as a function of the comparison (figure 2 output of loop filter page 5/1 section II.A).

As per claim 2 Langlais et al. teach a method where the first and second signals each comprises turbo-encoded data (figure 2 page 5/1 section II.A first paragraph).

As per claim 3 Langlais et al. teach that the multiplied first and second signals each comprises a baseband signal (figure 2 output of mapper page 5/1 section II.A first paragraph and reference [7]).

As per claim 5 Langlais et al. teach that the comparison of the adjusted first signal with the multiplied first signal comprises detecting a phase difference between the adjusted first signal and the multiplied first signal (figure 2 and page 5/1 section II.A).

As per claim 6 Langlais et al. teach that the adjustment of the reference frequency comprises tuning a voltage controlled oscillator as a function of the phase difference between the adjusted first signal and the multiplied first signal (figure 2 and page 5/1 section II.A, the VCO in inherited in the PLL see figure 3).

As per claim 7 Langlais et al. teach that the adjustment of the reference frequency comprises adjusting the reference frequency to be substantially equal to a frequency of the carrier signal (figure 2 and page 5/2 section III.A).

As per claim 8 Langlais et al. teach that the first and second received signals each comprises a symbol representing a constellation point, and wherein the adjustment of the multiplied first signal comprises quantizing the multiplied first signal to its nearest constellation point as a function of the multiplied first and second signals (figure 2 and page 5/1 section II.A).

As per claim 10 Langlais et al. teach that the transmitting signals including the first and second signals, wherein the receiving of the first and second signals comprises receiving the transmitted signals (figure 2 and page 5/1 section II.A).

As per claim 11 Langlais et al. teach that the transmission of the signals comprises turbo encoding the signals before transmission (figure 2 and page 5/1 section II.A inherit to the turbo decoder will be a turbo encoder).

As per claim 15 Langlais et al. teach a receiver, comprising: an oscillator having a reference signal output with a tunable reference frequency (figure 2 and page 5/1 section II.A the VCO in inherited in the PLL see figure 3); a multiplier to multiply a first signal with the reference signal, and to multiply a second signal, succeeding the first

signal in time, with the reference signal, the first and second signals each being modulated on a carrier frequency (figure 2 multiplier after y(k) page 5/1 section II.A); a slicer to adjust the multiplied first signal based on the multiplied first and second signals where the slicer comprises a Viterbi decoder (figure 2 block in dot lines label module of turbo-decoder page 5/1 section II.A the Viterbi decoding is done in DEC1 and feed to the mapper); and a detector to compare the adjusted first signal with the multiplied first signal, the detector being adapted to tune the reference frequency as a function of the comparison (figure 2 phase detector page 5/1 section II.A).

As per claim 16, 22 and 28 Langlais et al. teach that the oscillator comprises a voltage controlled oscillator (figure 2 and page 5/1 section II.A the VCO in inherited in the PLL see figure 3).

As per claim 18, 24 and 30 Langlais et al. teach that the in the Turbo4, the trellis length of DEC1 is equal to 29 bits which limits the number of accessible decoded symbols to 29 for a 1/2 rate encoder. Therefore, the possible values that delay Tr can take a: $0 \alpha Tr \alpha 28Ts$ where Ts is the symbol duration and Tr=dTs In the case of zero delay tentative decision, the extraction is performed at the input of the trellis. The decision results from the selection of the trellis path just after the corresponding bits have entered the DEC1 decoding trellis, this case does not consider future values of the signal only past values (page 5/2 first paragraphs).

As per claim 19, 25 and 31 Langlais et al. teach that the detector comprises a phase detector to compare a phase of the adjusted first signal with a phase of the

multiplied first signal, the phase detector being adapted to tune the reference frequency as a function of a difference in phases (figure 2 phase detector page 5/1 section II.A).

As per claim 21 Langlais et al. teach a receiver, comprising an oscillator having a tuning input (figure 2 and page 5/1 section II.A the VCO in inherited in the PLL see figure 3); a multiplier having a first input to receive a signal, and a second input coupled to the oscillator, the signal comprising a first signal and a second signal succeeding the first signal in time, the first and second signals each being modulated on a carrier frequency (figure 2 multiplier after y(k) page 5/1 section II.A); a slicer having an input coupled to the multiplier, and an output where the slicer comprises a Viterbi decoder (figure 2 block in dot lines label module of turbo-decoder page 5/1 section II.A the Viterbi decoding is done in DEC1 and feed to the mapper); and a detector having a first input coupled to the slicer input, a second input coupled to the slicer output, and an output coupled to the tuning input of the oscillator (figure 2 phase detector page 5/1 section II.A).

As per claim 27 Langlais et al. teach a receiver, comprising oscillator means for generating a reference signal having a tunable reference frequency (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL); multiplier means for multiplying a first signal with the reference signal, and multiplying a second signal, succeeding the first signal in time, with the reference signal, the first and second signals each being modulated on a carrier frequency (figure 2 multiplier after y(k) page 5/1 section II.A); slicer means for adjusting the multiplied first signal based on the multiplied first and second signals, where the slicer comprises a Viterbi decoder (figure 2 block in

dot lines label module of turbo-decoder page 5/1 section II.A the Viterbi decoding is done in DEC1 and feed to the mapper); and detector means for comparing the adjusted first signal with the multiplied first signal, the detector means comprises tuning means for tuning the reference frequency as a function of the comparison (figure 2 phase detector page 5/1 section II.A).

As per claim 33 Langlais et al. teach a method of processing signals having a first and second symbol each representing a constellation point, the first symbol preceding the second symbol in time, the method comprising: quantizing the first symbol to its nearest constellation point as a function of the first and second signals , where the slicer comprises a Viterbi decoder (figure 2 d(k) output of the slicer page 5/1 section II.A the Viterbi decoding is done in DEC1 and feed to the mapper); comparing the first symbol to the quantized first symbol (figure 2 phase detector page 5/1 section II.A); and adjusting a reference frequency as a function of the comparison (figure 2 input to the multiplier page 5/1 section III.A).

As per claim 34 Langlais et al. teach a method of receiving the first and second symbols before the first symbol is quantized (figure 2 input to the multiplier page 5/1 section III.A).

As per claim 35 Langlais et al. teach a method of transmitting the signals including the first and second symbols, wherein the receiving of the first and second symbols comprises receiving the transmitted signals (figure 2 input to the multiplier page 5/1 section III.A).

As per claim 36 Langlais et al. teach that the transmission of the signals comprises turbo encoding the first and second symbols before transmission (figure 2 page 5/1 section II.A first paragraph).

As per claim 40 Langlais et al. teach that the received first and second symbols are each modulated on a carrier frequency, the method further comprising multiplying each of the first and second symbols with a reference signal having the reference frequency (figure 2 multiplier page 5/1 section II.A first paragraph).

As per claim 41 Langlais et al. teach that the multiplication of the first and second modulated symbols each comprises recovering the respective symbol by removing the respective carrier frequency (figure 2 inherit to the multiplier page 5/1 section II.A first paragraph).

As per claim 42 Langlais et al. teach that the first and second symbols each comprises turbo encoded data (figure 2 page 5/1 section II.A first paragraph).

As per claim 44 Langlais et al. teach that the comparison of the first symbol with the quantized first symbol comprises detecting a phase difference between the first symbol and the quantized first symbol (figure 2 phase detector page 5/1 section II.A first paragraph).

As per claim 45 Langlais et al. teach that the adjustment of the reference frequency comprises tuning a voltage controlled oscillator as a function of the phase difference between the first symbol and the quantized first symbol (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 47 Langlais et al. teach a receiver to receive a signal including first and second symbols each representing a constellation point, the first symbol preceding the second symbol in time, the receiver comprising a slicer to quantize the first symbol as a function of the first and second symbols, where the slicer comprises a Viterbi decoder (figure 2 turbo-decoder block page 5/1 section II.A the Viterbi decoding is done in DEC1 and feed to the mapper); a detector to compare the first symbol to the quantized first symbol (figure 2 phase detector page 5/1 section II.A); and an oscillator having a tunable output as a function of the comparison (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 48 Langlais et al. teach that the first and second symbols are each modulated on a carrier frequency, the receiver further comprising a multiplier to multiply each of the first and second symbols with the oscillator output to recover its respective symbol by removing its respective carrier frequency (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 50 Langlais et al. teach that the detector comprises a phase detector to detect a phase difference between the first symbol and the quantized first symbol (figure 2 phase detector page 5/1 section II.A).

As per claim 51 Langlais et al. teach that the oscillator comprises a voltage controlled oscillator (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 53 Langlais et al. teach a communication system, comprising: a transmitter to transmit a signal including first and second symbols each representing a

constellation point, the first symbol preceding the second symbol in time (page 5/1 section I and inherited in figure 2 and section II); and a receiver including a slicer to quantize the first symbol as a function of the first and second symbols, where the slicer comprises a Viterbi decoder (figure 2 turbo-decoder block page 5/1 section II.A the Viterbi decoding is done in DEC1 and feed to the mapper), a detector to compare the first symbol to the quantized first symbol, and an oscillator having a tunable output as a function of the comparison (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 54 Langlais et al. teach that the transmitter modulates the first and second symbols on a carrier frequency, and the receiver further comprises a multiplier to multiply each of the first and second symbols with the oscillator output to recover its respective symbol by removing its respective carrier frequency (page 5/1 section I, figure 2 multiplier, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 56 Langlais et al. teach that the detector comprises a phase detector to detect a phase difference between the first symbol and the quantized first symbol (figure 2 phase detector page 5/1 section II.A).

As per claim 57 Langlais et al. teach that the oscillator comprises a voltage controlled oscillator (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 58 Langlais et al. teach that the transmitter further comprises a turbo encoder to turbo encode the signals before transmission to the receiver (page 5/1 section I).

As per claim 59 Langlais et al. teach that the turbo encoder comprises a trellis encoder to encode a first portion of the signals including the fist and second symbols, and an interleaver coupled to a trellis encoder to process a second portion of the signal (page 5/2 section II.A last paragraph inherit to the turbo trellis in the receiver will be the trellis in the transmitter and the interleaver).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 12, 20, 26, 32, 37,52 and 59-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Langlais et al. ("Synchronization in the carrier recovery of a satellite link using turbo-codes with the help of tentative decisions", IEE Colloquium on Turbo Codes in Digital Broadcasting - Could It Double Capacity? 22 Nov. 1999 pages: 5/1 - 5/7) as applied to claim 11 above, and further in view of Robertson et al., "Bandwidth-Efficient Turbo Trellis-coded Modulation Using Punctured Component Codes," IEEE Journal on Selected Areas in Communications; 02/1998,.p.p. 206-218,. Vol. 16, No. 2).

As per claims 12, 37 and 61 Langlais teach claims 11, 36 and 58. Langlais doesn't specifically teach that the signals comprise interleaving and de-interleaving of the turbo encoded signals before transmission. Robertson teaches that the turbo-coded transmitted signals comprise interleaving and de-interleaving of the turbo encoded

signals before transmission (figure 2 and 2 page 208 section II the encoder). Langlais and Roberson teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to integrate the interleaving and de-interleaving of the turbo encoded signals before transmission taught by Roberson with the carrier recovery scheme taught by Langlais. The suggestion/motivation for doing so would have been to ensure that the ordering of the two information bits partly defining each symbol corresponds to that of the first encoder (Roberson page 208 section II. A) and to reduce the latency of the turbo decoder. Therefore, it would have been obvious to combine Langlais and Roberson to obtain the invention as specified in claims 12, 37 and 61.

As per claims 20, 26, 32 and 52 Langlais et al. teach claims 15, 21, 27 and 47. Langlais doesn't teach a switch between the multiplier and the decoder input. Robertson teaches a switch between the multiplier and the decoder input (figures 4 and 5 pages 211, 212 and 213 section III the decoder). Langlais and Roberson teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporate the switch between the multiplier and the decoder input taught by Roberson with the carrier recovery scheme taught by Langlais. The suggestion/motivation for doing so would have been to ensure that the ordering of the two information bits partly defining each symbol corresponds to that of the encoder (Roberson page 208 section II. A) and to reduce the latency of the turbo decoder. Therefore, it would have been

obvious to combine Langlais and Roberson to obtain the invention as specified in claims 20, 26, 32 and 52.

As per claim 59 Langlais et al. teach claim 58. Langlais doesn't specifically indicate the turbo encoder comprising a trellis encoder to encode a first portion of the signals including the fist and second symbols, and an interleaver coupled to a trellis encoder to process a second portion of the signal. Robertson specifically teaches (title: "...turbo trellis-coded...") a turbo encoder comprising a trellis encoder to encode a first portion of the signals including the fist and second symbols, and an interleaver coupled to a trellis encoder to process a second portion of the signal (figures 1 and 2 page 207 section II the encoder). Langlais and Roberson teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to supplement the turbo trellis code and the interleaving turbo-trellis encoded signals taught by Roberson with the carrier recovery scheme taught by Langlais. The suggestion/motivation for doing so would have been to obtain a more powerful bandwidth-efficient encoder (Roberson page 206 abstract). Therefore, it would have been obvious to combine Langlais and Roberson to obtain the invention as specified in claim 59.

As per claim 60 Roberson and Langlais teach claim 59. Roberson also teaches that the receiver further comprises a switch positioned before the decoder to pass only the first portion of the signal to the decoder (figures 4 and 5 pages 211, 212 and 213 section III the decoder). Langlais and Roberson teachings are analogous art because

they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporate the switch between the multiplier and the decoder input taught by Roberson with the carrier recovery scheme taught by Langlais. The suggestion/motivation for doing so would have been to ensure that the ordering of the two information bits partly defining each symbol corresponds to that of the encoder (Roberson page 208 section II. A) and to reduce the latency of the turbo decoder. Therefore, it would have been obvious to combine Langlais and Roberson to obtain the invention as specified in claim 60.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan A. Torres whose telephone number is (571) 272-3119. The examiner can normally be reached on Monday-Friday 9:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Juan Alberto Torres, Ph. D.
04-21-2005

M. G.

MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER

Amendments to the Drawings:

The attached sheets of drawings include changes to Figs. 1 and 2. These sheets, which include Figs. 1 and 2, replace the original sheets including these figures.

Attachment: Replacement Sheets
Annotated Sheets Showing Changes

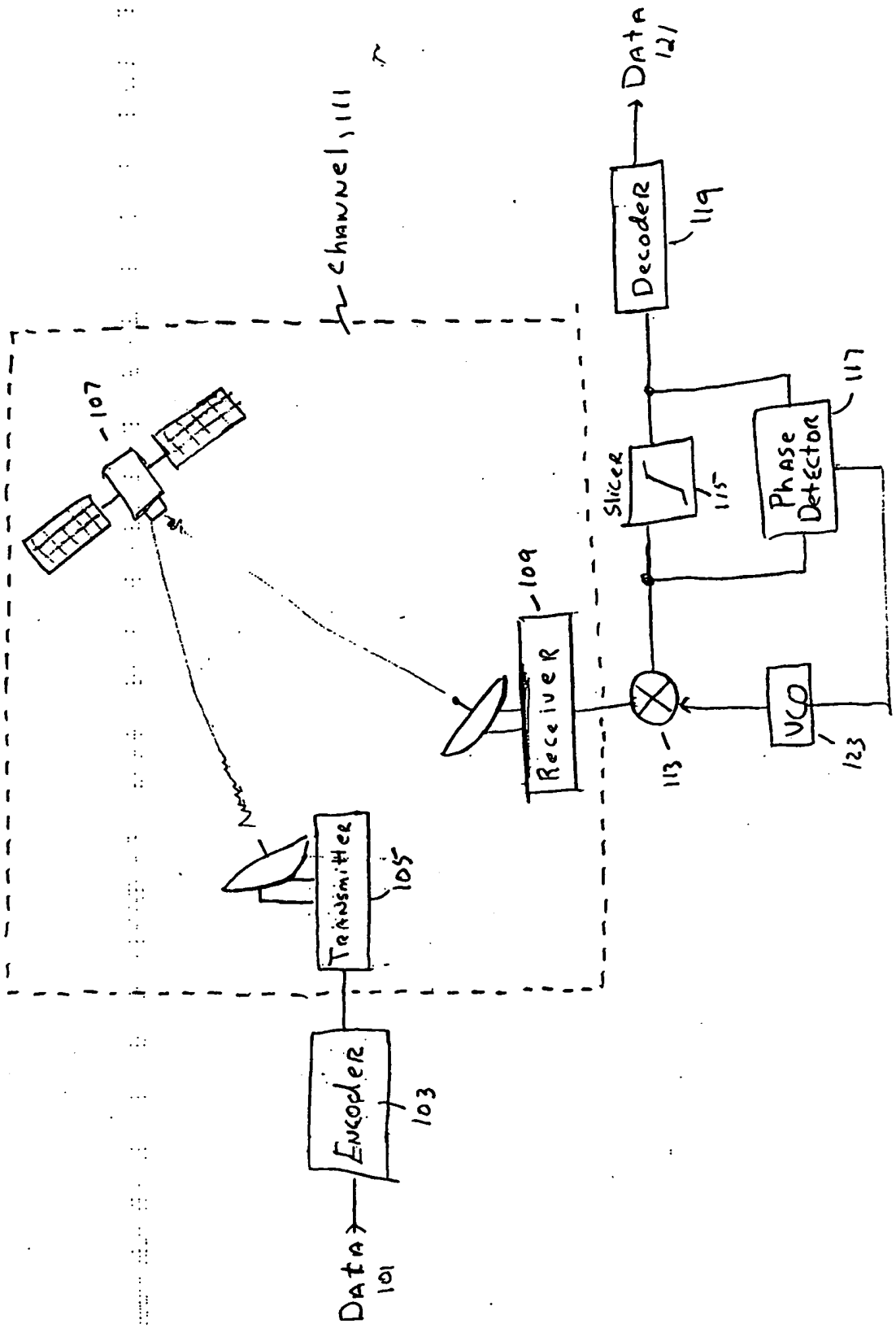

Figure #1
Prior Art

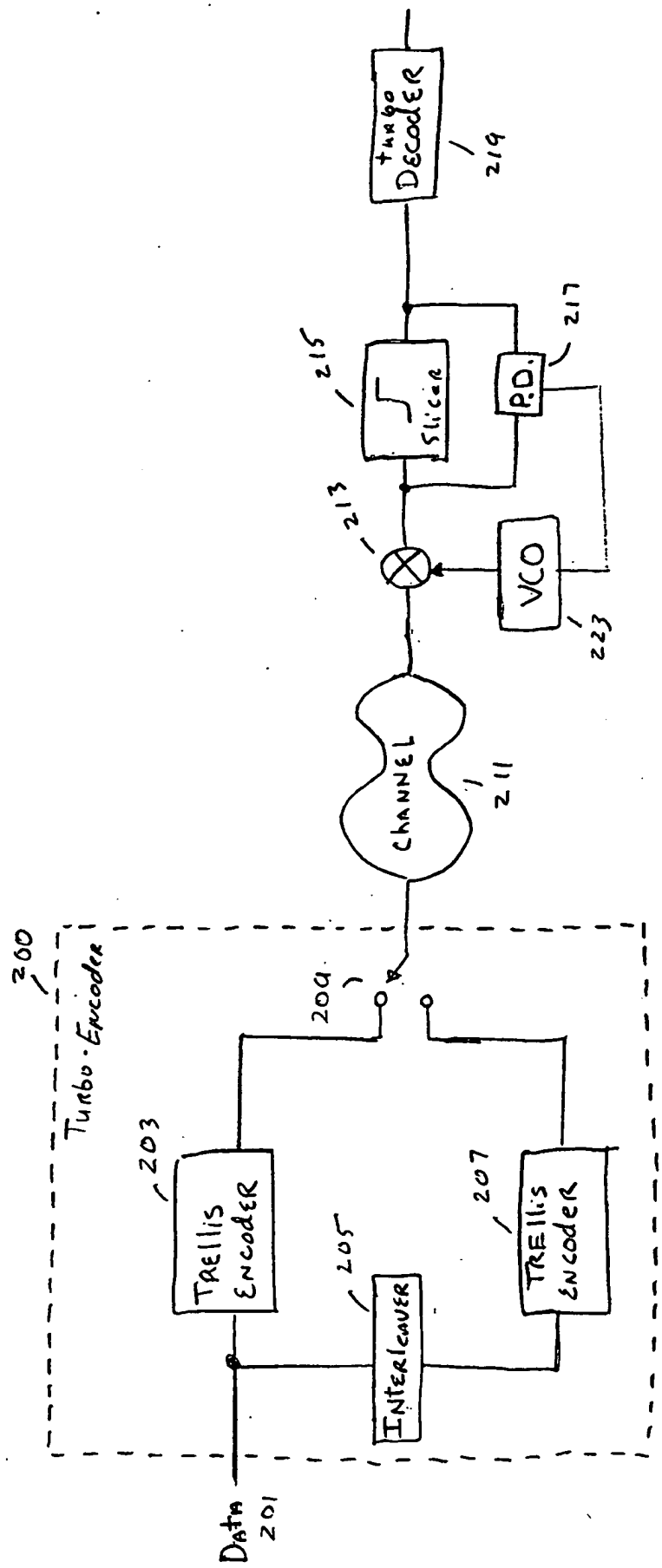

Figure #2

Prior Art

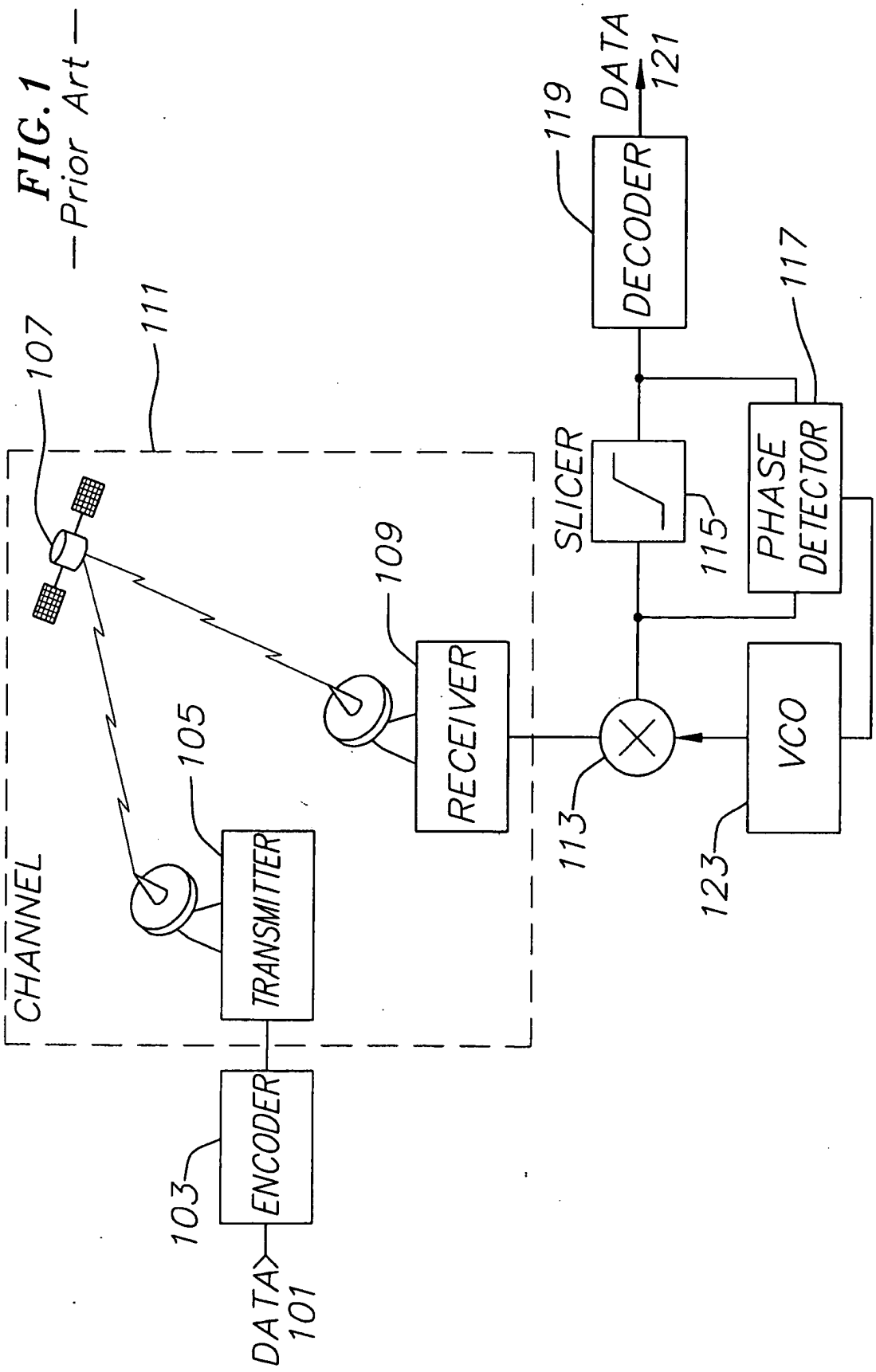

FIG. 1
—Prior Art—

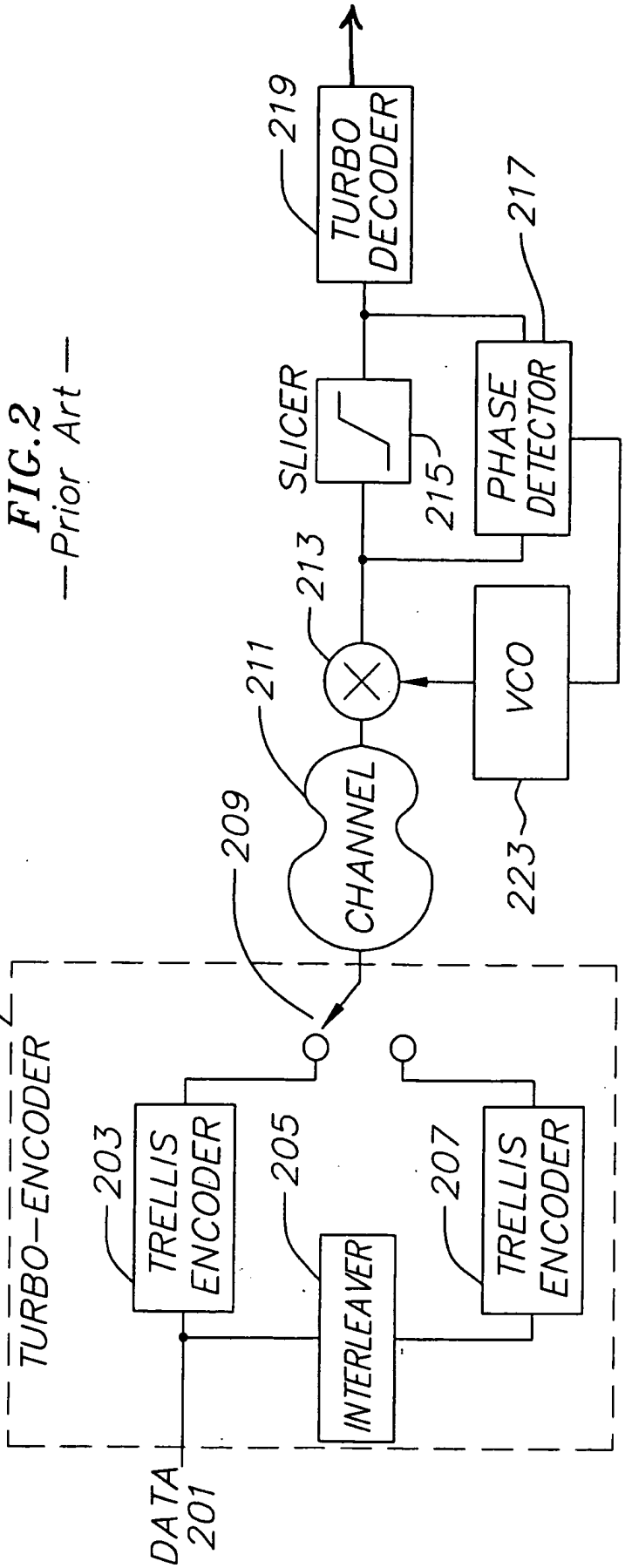

FIG. 2
—Prior Art—

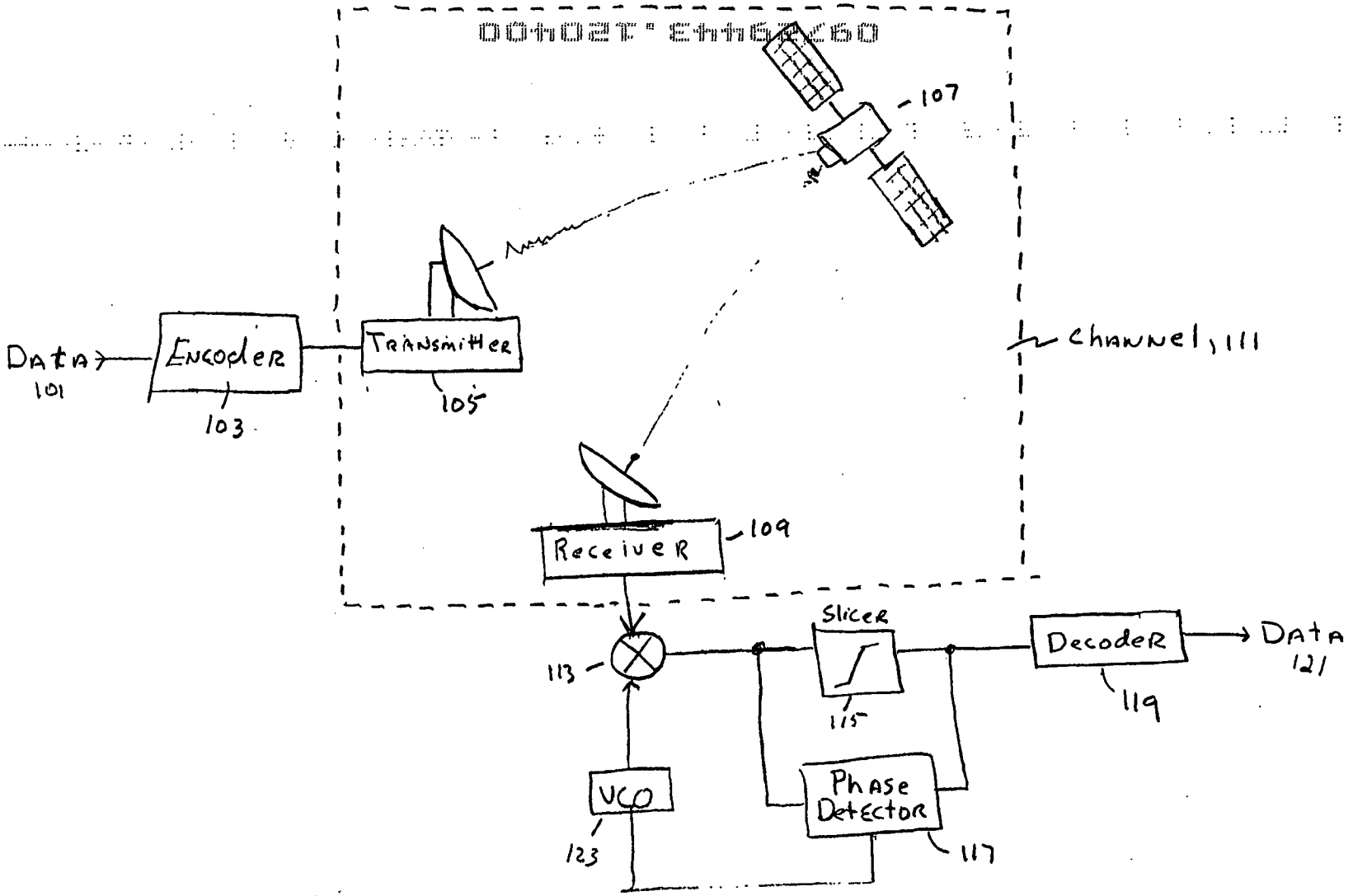

Figure #1

(prior art)

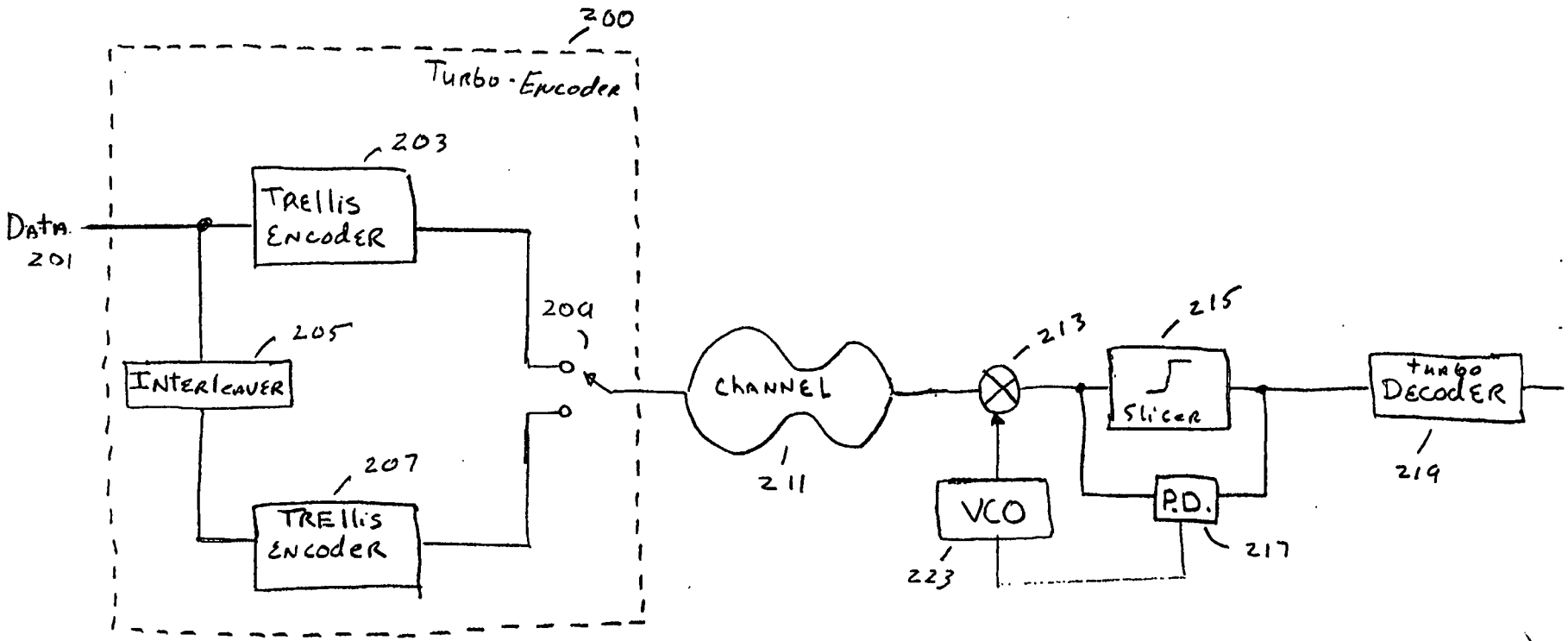

Figure #2

(prior art)

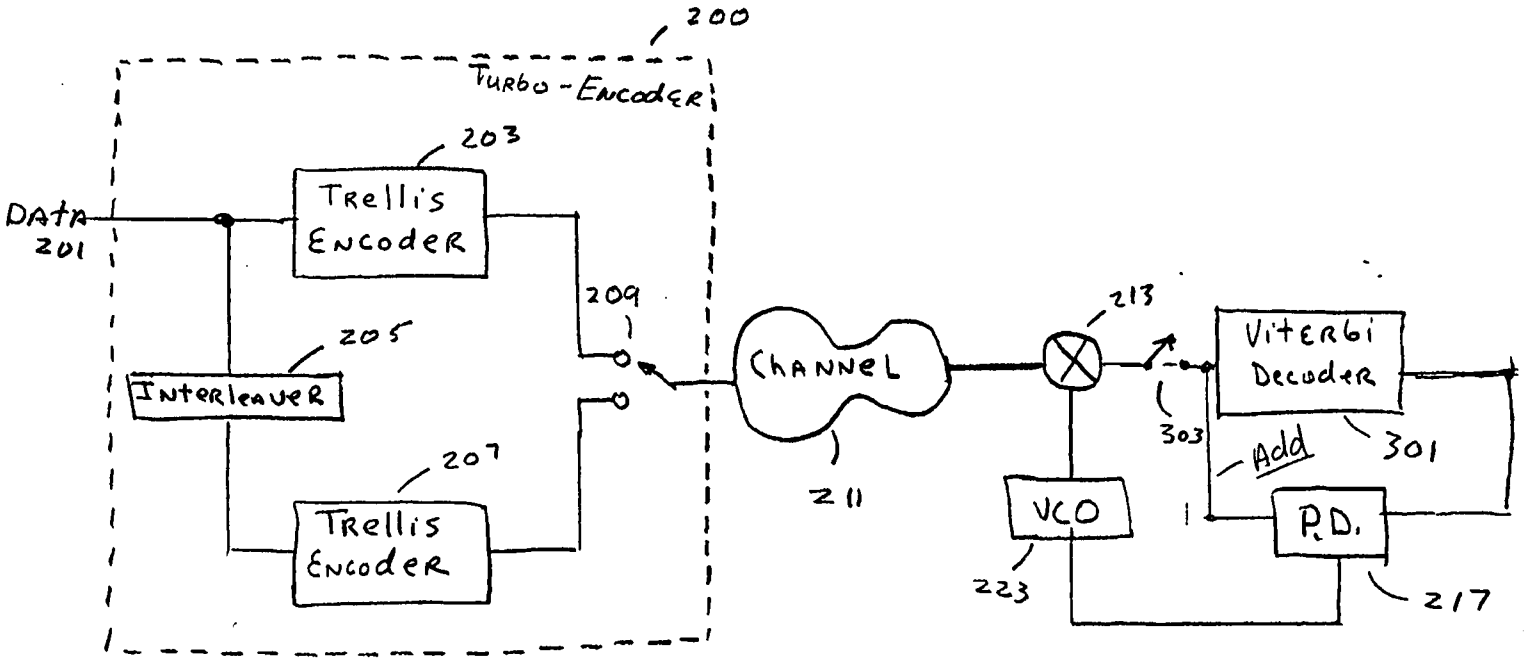
200
Turbo-Encoder
203
Trellis Encoder
DATA 201
205
Interleaver
207
Trellis Encoder
209
Channel
211
213
303
Viterbi Decoder
301
Add
VCO
223
P.D.
217

Figure 3

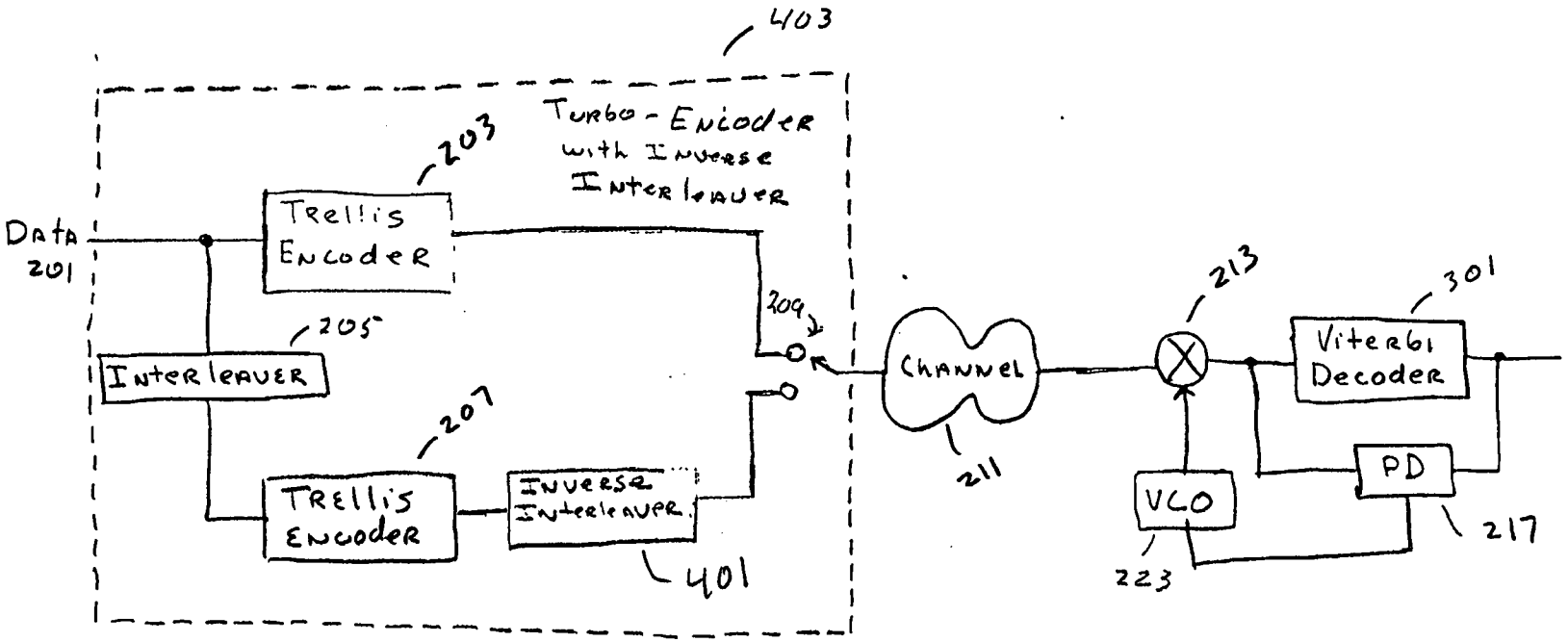
403
Turbo-Encoder with Inverse Interleaver
203
Trellis Encoder
Data 201
205
Interleaver
207
Trellis Encoder
Inverse Interleaver
401
209
Channel
211
213
Viterbi Decoder
301
PD
217
VCO
223

Figure #4